



1/12

FIG.1-1

VAP-1 amino acid sequence (SEQ ID NO:1)

MAVLAVVLLACLERAQTFGCSNTKINDQARKMFYDAHNDARRSMAKGLE
PNKCGLLSGGKNVYELNWDCEMEAKAQEWADGCPSSFQTFDPTWGQNYATYM
GSIADPLPYASMAVNGWSEIRTVGLTDPDNKYTNSAMFRFANMANGKASAFG
CAYALCAGKLSINCIYNKIGYMTNAIIEKGDACSTDACETTYSDSQCKNGLCYK
APQAPVVETFTMCPSVTDQSDQARQNFLDTHNKLRTSLAKGLEADGIAAGAFAP
MAQMPKLVKYSCVEANARTWAKGCLYQHSTSAQRPGLGENLYMISINNMP
KIQTAEDESSKAWWSELKDFGVGSDNILTQAVFDRGVGHYTMAWEGTTEIGCF
VENCPTFTYSVCQYGPAGNYMNQLIYTKGSPCTADADCPGTQTCSVAEALCVIP

vap-1 cDNA nucleotide sequence (SEQ ID NO:2)

ATGGCGGTATTAGCAGTGGTACTTCTAGCATGCCCTGGAGAGCGGTTG
CACAGACGTTGGCTGCTCTAACACCAAGATCAATGACCAGGCTCGTAAGAT
GTTCTATGATGCTCACAATGATGCAAGACGAGCATGGCTAAGGGCTTGAG
CCAAACAAGTCCGACTCTTATCTGGTGGAAAGAAATGTTATGAATTGAATT
GGCATTCGGAGATCGAAGCAAAAGCTCAGGAATGGCAGACGGAATGTCCCA
GCTCTTCCAGACATTTGATCCAACATGGGGCAGAACTACGCGACGTACAT
GGGATCGATTGCTGATCCGCTTCCATACGCTTCCATGGCTGTTAATGGTGGT
GGTCGGAAATTAGAACCGTAGGACTTACGGATCCTGATAACAAGTACACTAA

To Fig.1-2



COPY OF PAPERS
ORIGINALLY FILED

2/12

FIG. 1-2

FROM Fig. 1-1

CAGTGCAATGTTCCGATTIGCTAATAATGGCAAAATGGTAAAGCTTCAGCTTTTG
GATGTGCATACGCGTTGTCCGAGGAAACTATCCATCAATTCATTTACAA
CAAGATAGGATACATGACCAATGCTATCATTTATGAAAAGGAGATGCCGTG
ACCAAGTACGCTGAATGCACCACCTACTCAGACTCACAAATGCAAAACGGTC
TTTGCTATAAGGCACCTCAAGCTCCAGTCGTTGAGACTTTCACAAATGTGCCCT
TCGGTCACGACCAAGTCGGATCAGCGCGTCAAAACCTTCTTGGACACCCATA
ACAAATTGCCGTACAAGCCTTGCCCAAGGACTTGAAGCTGATGGAATTGCCGC
TGGAGCAATTGCACCCTAATGGCCAAAGCAATGCCAAACTGGTAAATACAGC
TGCACAGTTGAAGCAACGCCAGAACATGGGCAAAAGGATGCCCTTACCAGC
ATTCAACAAGCGCACAGAGACCAGGACTCGGTGAAATCTTTATATGATCAG
CATTAAACAATGCCTAAATTCAAACCGGAGGACTCCTCAAAGGCTTGG
TGGTCCGAGTTGAAGACTTCGGAGTCGGTTCGACAACATTCAGACCCCAAG
CAGTTTTTGATCGTGGCGTTGGACATTACACACAAATGGCATGGGAAGGAAC
TACTGAAATTGGATGTTTTGTGGAGAAATGTCCAACATTCACCTTATCCGTAT
GCCAATATGGTCCAGCGGAAACTACATGAACCAACTAATCTATACCAAGGG
CTCACCATGCACAGCTGACGCCGATTGCCAGGAACCCAGACATGCAGTGTG
GCTGAAGCATTATGTGTTATCCCTTAGTAAATTTCTATGCAACTCTTGAAA
GTCATAATAAATATGCAAAATTAATAAAAAAAAAA

To Fig. 1-3



FIG.1-3

FROM Fig.1-2

VAP-2 amino acid sequence (SEQ ID NO:3)

MNVVLSAVTLFLIFRYAQTVNIEGSGNDELLEQNVWVDVDDKVVEALGGLDD
ELLTEHVCNKSTITLQQEII LTTNELLRRSLAFGKQRNKRGLMNGARNMYKLD
WDCELASLAANWSTSCPQHFMPSVLGSNAQLFKRFYFYFDGHDSTVHMRNA
MKYWWQQGEEKGNEDQKNRFYARRNYFGWANMAKGTYRVGCSYIMCGDG
ESALFTCLYNEKAQCEKEMIYENGKPCCEDKDCFTYPSKCLVPEGLCQAPSMV
KDDGGSFQCDNSLVSDVTRNFTLEQHNFYRSRLAKGFEWNGETNTSQPKASQM
IKMEYDCMLERFAQNWANNCVFAHSAHYERPQNQCNLYMSSFSNPDPRSLIHT
AVEKWWQEELEFGTPIDNVLTPELWDLKGKAIGHYTQMAWDRTYRLGCGIANC
PKMSYVCHYGPAGNRKNNKIYEIGDPCEVDDDCPIGTDCEKTTSLCVISK

vap-2 cDNA nucleotide sequence (SEQ ID NO:4)

ATGAACGTGGTCCTTTCCGCTGTCACTCTTTTCTTATTTTCGATATGGCAG
ACTGTGAATATAGAAGCCAGTGGAGGAATGATGAGCTTCTTGAGCAGAAGC
TGTGGAACCATGTAGACGACAAAGTTGTAGAAGCACTTGGTGCTTGATGA
TGAACCTGCTAACCGAACAATGTGTGTAAACAAATCAACGATCACTCAGCTACAG
CAGGAGATCATCTTGACAACCCACAATGAATTACGAAGATCAATTGGCTTTTCG
GAAAGCAAGAAACAAGAGAGGTCTCATGAACGGTGGGAGAAATATGTATA
AACTGGATTGGGATTGTGAACCTGGCATCACTTGCAGCCAATTGGTCAACCTCC
TGCCCTCAGCACCTTATGCCGCAATCGGTACTTGGCTCCAACGCTCAGCTTTT

To Fig.1-4



COPY OF PAPERS
ORIGINALLY FILED

4/12

10051644-080502

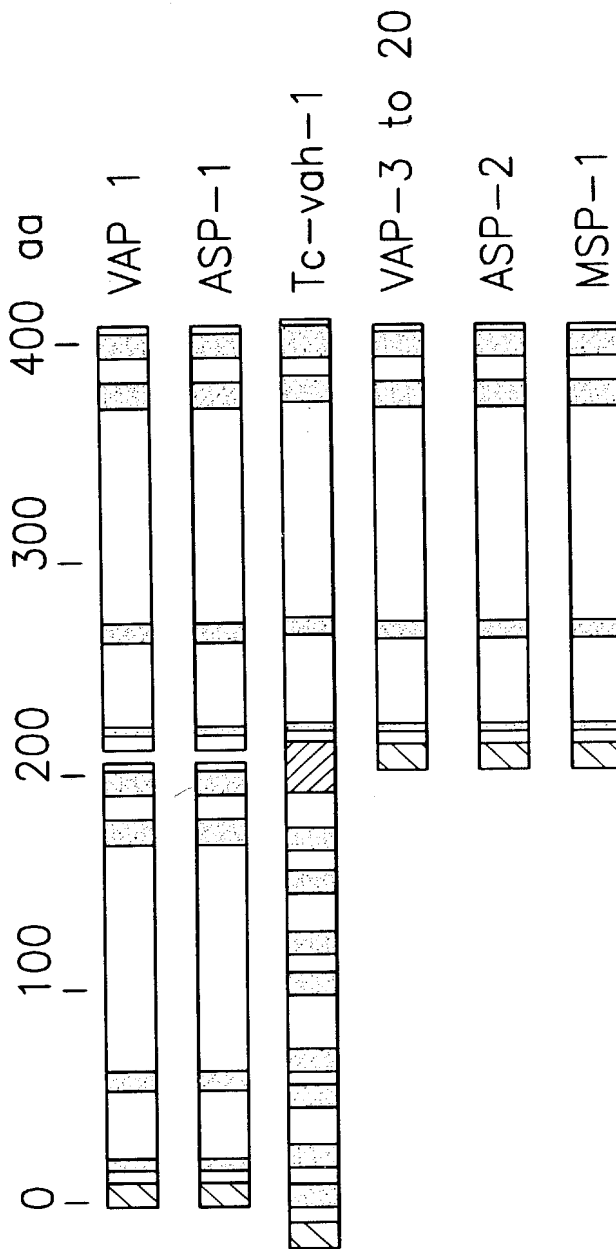
FIG. 1-4



FROM Fig. 1-3

TAAGCGTTTCTATTTTATTTTATGATGGCAGCACTCTACTGTACATATGCCAA
ACCGGATGAAGTATTGGTGCAGCAAGGTGAAGAAAGGCAATGAGGATC
AGAAAAATAGATTCTATGCCAGACGAAATTTTGGATGGCAACATGGC
AAAAGGAAAAACATATCGAGTTGGATGCTCGTATATTATGTGCGCGACGGT
GAATCTGCACTTTTCACTTGTCTTTATAACGAAAAAGCCCAATGCCAAAAAG
AAATGATTTACGAAATGGAACCCCTGCTGTGAGGATAAAGACTGTTTCAC
ATATCCAGGATCAAAATGTTTAGTACCTGAAGGATTATGTCAAGCACCTTCTA
TGGTAAAGGATGATGGAGGAAGTTTCCAATGTGATAACTCCCTTGTGTGAGA
TGTCACCCGCAATTTCACTTTGGAGCAACACAAATTTTATAGATCTCGTCTTG
CAAAAGGTTTGAATGGAATGGAGAAACAAACACTTCCCAGCCAAAGGCTAG
TCAAATGATCAAAATGGAGTATGACTGCATGTTGGAACGGTTTGCACAAAC
TGGGCAAAATAATTGCGTTTTCACACACTCGGCACATTACGAAAGACCGAATC
AGGTCAGAAATCTCATATGAGTCTTCTCAAACCCCTGATCCTAGAAGCCTT
ATACATACGGCCGTCGAGAAAGTGGTGGCAGGAAATGGAGGAGTTCGGTACTC
CAATTGATAACGTTCTGACACCCGAAATGTGGGATTTGAAAGGAAAGCGAT
AGGACATTACACTCAGATCGCCCTGGATCGTACTTACCCTCTTGGTTGTGGAA
TCGCAAACTGTCCGAAGATGTCGTACGTGGTTTGTCACTATGGCCAGCAGG
CAACAGAAACAACAATAAATCTATGAAATCGGGATCCTTCCGAAAGTCCGAT
GATGATTGCCCCGATTGGAACAGATTGTGAAAGACAACTTCTTTATGTGTGAT
CTCAAAATAA

FIG.2

Schematic diagram of nematode venom allergen protein domains



 hydrophobic signal sequence
 conserved cysteine(s)



COPY OF PAPERS
ORIGINALLY FILED

5/12

10051644.080502



COPY OF PAPERS
ORIGINALLY FILED

6/12

10051644 . 080502

FIG.3-1

CLUSTAL W Alignment of VAP-1, VAP-2, and selected other nematode VA proteins.

VAP-1N	1	-----MAVLAVVLLACLERA	VAQTFG	22
VAP-1C	1	-----PQAPVVETFTM		11
VAP-2N	1	MNVLSAVTLFLIFRYAQTVNIEGSGNDELLEQNVDVDDKVVEALGGLDEL	TEHV	60
VAP-2C	1	-----SFQ		3
ASP-1N	1	-----MFSPVIVSVIFT	AFCDASPARDGFG	26
ASP-1C	1	-----DVPETNQ		8
VAP-3	1	-----MNYLLLVVALAVG		13
MSP-1	1	-----MSNKLISILITI		14

VAP-1N	23	CSNTKIN--DQARKMFYDAHNDARRRSMAGLE	EPN---	KCGLLSGGKNVYEL	N-WDC	MEA	76		
VAP-1C	12	CPSVT-DQSDQARQNFLDT	HNKLR	TSLAKGLEADG	IAGAFAPMAKQMPKL	VKY	SCTVEA	70	
VAP-2N	61	CNKST--ITQLQEIIL	TTHNELRSLAFGKQRN---	KRGLMNGARNMYKLD	-WDC	ELAS	114		
VAP-2N	4	CNSLV--SDVTRNFTLEQHNFYRSRLAKGF	EWNG-ETNTSQPKASQM	I	KME-YDC	MLER	59		
ASP-1N	27	CSNSG--ITDKDRQAF	LD	FHNARRRVAKGVEDS---	NSGKLNPAKNMYKLS	-WDC	AMEQ	80	
ASP-1C	9	CPSNT-GMTDSVRD	TFLSVHNEFRSSVARGLE	EPD--ALGGNAPKAAKML	KMV-YDC	EVEA	64		
VAP-3	14	CSADFG---SSQNGI	INAHNTLRSKI	AKGTYVA---	KGTQKSPGTNLL	KMK-WD	SAVA	66	
MSP-1	15	YTVVNSLTP	PEQNAVVDCT	INKYRSQLANGKTKN---	KNGGNFSPGKD	I	LEVS-Y	SKDLEK	71

To Fig.3-2



COPY OF PAPERS
ORIGINALLY FILED

10051644 . 080502

7/12

FIG.3-2

FROM Fig.3-1

VAP-1N	77	KAQEWADG	CPSS	FQT	FDPT	WGQNYAT	MGSI	ADPLPYAS	MAVNG	WSEI	RTVG	129	
VAP-1C	71	NARTWAK	GCLYQH	STSAQR	PG	LGENLYM	SINN	MPKIQTA	EDSSKA	WSEL	KDFG	125	
VAP-2N	115	LAA	NWST	SCIPQH	MPQSV	LGS	NAQLFKR	FYFD	CHDSTV	HMRNA	KYWWQ	QGEK	171
VAP-2C	60	FAQNWAN	NCVFAH	SAHYER	PN	QGNLYM	SSFSN	PDPRSL	IHTA	VEKWWQ	ELEEF	114	
ASP-1N	81	QLQDA	IQSC	PSAF	AG	IQG	VAQNVMS	WSSGG	FDPSPV	KIEQTL	SGWWS	GAKK	134
ASP-1C	65	SAIRHGN	KCVYQH	SHGED	RPG	LGENIYK	TSVLK	FDKNKAA	KQASQL	WWNEL	KEFG	119	
VAP-3	67	SAQNYAN	GCPTGH	HSG	DAG	LGENLYW	YWTSG	SLGDLN	QYGSAA	SASWEK	EFQD	YG	120
MSP-1	72	SAQRWAN	KCIFD	HNGTDL	YSGG	KFYGENLY	DGDFEH	KNITQLM	IDACNA	WWGE	TTDG	130	

VAP-1N	130	LTD	PDNK	YTNSA	MFRFAN	MANGKAS	AFGCAYAL	CAGKL	SINCI	172			
VAP-1C	126	VGSD	NLTQA	VFDRG	VGHYTQ	MAWEGT	TEIGCF	VENCPT	FTYSVCQ	171			
VAP-2N	172	NEDQ	KNR	FYARRN	YFGWAN	MAKGT	YRVGCSY	IMCGD	GESALFTCL	217			
VAP-2C	115	TPID	NVLTPE	LWDLKG	KAI	GHYTQ	MAWDR	TYRLGCG	IANCP	KMSYV	VCH	163	
ASP-1N	135	VGPD	N	KYNGG	LFAFSN	VMVYSE	TTKLGCAY	KVCGTKL	AVSCI	176			
ASP-1C	120	VGPS	NVLT	TA	LWNR	PGMQI	GHYTQ	MAWDT	TYKLGC	AVVFC	NDFT	FGVCQ	168
VAP-3	121	WKS	NLMT	ID	LFNTG	GHATQ	MAWAK	SNLIGCG	VKDCGR	DSNGL	NKVT	VVCQ	171
MSP-1	131	VPPSWIN	NFLPT	DNKEN	DEKFE	AVGHWT	QMAWAK	TYQIGCAL	KVCHKP	DCNGN	LIDCR	188	

To Fig.3-3



COPY OF PAPERS
ORIGINALLY FILED

8/12

FIG.3-3

FROM Fig.3-2

VAP-1N	173	YNKI	GYMT	NA	I	YE	KG	DA	CT	SD	AE	CT	TY	S	D	SQ	KN	GL	CY	KA	-----	213																							
VAP-1C	172	YGP	AG	NY	MN	QL	I	YT	KG	SP	CT	AD	AD	CP	GT	Q	T	CS	VA	EAL	C	V	IP	-----	212																				
VAP-2N	218	YNE	KA	Q	CE	KE	M	Y	ENG	KP	CC	ED	KD	CF	TY	PG	SK	CL	VPE	GL	CQ	AP	SM	VK	DD	GG	268																		
VAP-2C	164	YGP	AG	NR	K	N	K	I	YE	I	GD	PC	EV	DD	CP	I	GT	D	CE	KT	SL	C	V	I	SK	-----	205																		
ASP-1N	177	YNG	V	G	Y	I	T	N	Q	P	WE	T	G	AC	KT	GA	DC	ST	YK	N	SG	CE	GL	CT	K	GP	-----	218																	
ASP-1C	169	YGP	GN	Y	M	G	H	V	I	Y	T	M	G	Q	P	CS	---	QC	SP	GA	---	TC	SV	TE	GL	C	S	A	---	P	---	206													
VAP-3	172	YK	P	Q	GN	F	I	N	Q	Y	I	Y	V	S	G	A	T	CS	---	GC	PS	G	T	---	SC	ET	ST	GL	C	V	-----	207													
MSP-1	189	YY	P	G	G	N	G	M	G	S	P	I	Y	Q	Q	K	P	AS	---	G	C	G	K	A	G	---	P	S	T	K	Y	S	G	L	C	K	P	D	P	H	Q	N	N	---	231

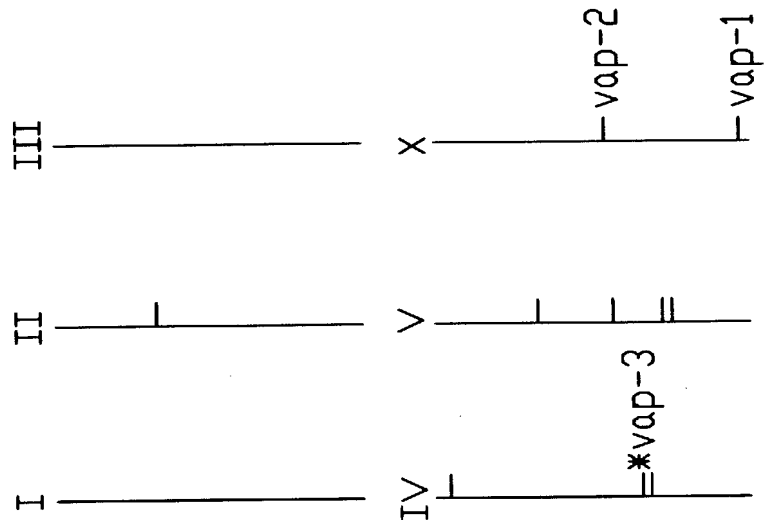


COPY OF PAPERS
ORIGINALLY FILED

9/12

FIG.4

Schematic map of selected *C. elegans* vap genes





COPY OF PAPER
ORIGINALLY FILED

10/12

FIG. 5B

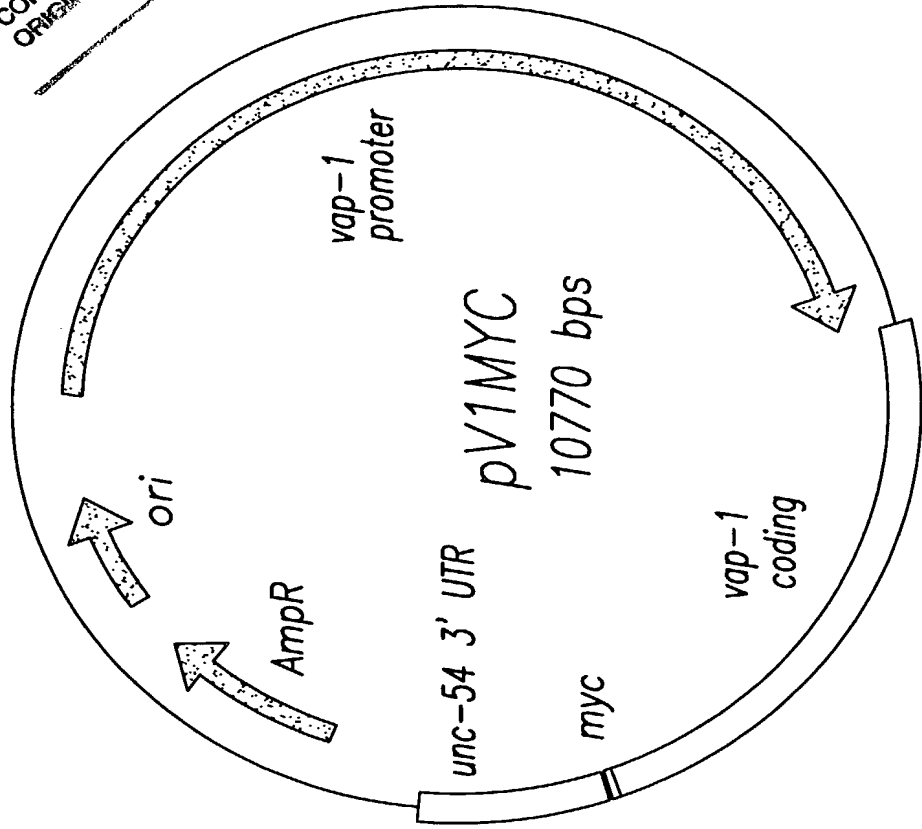
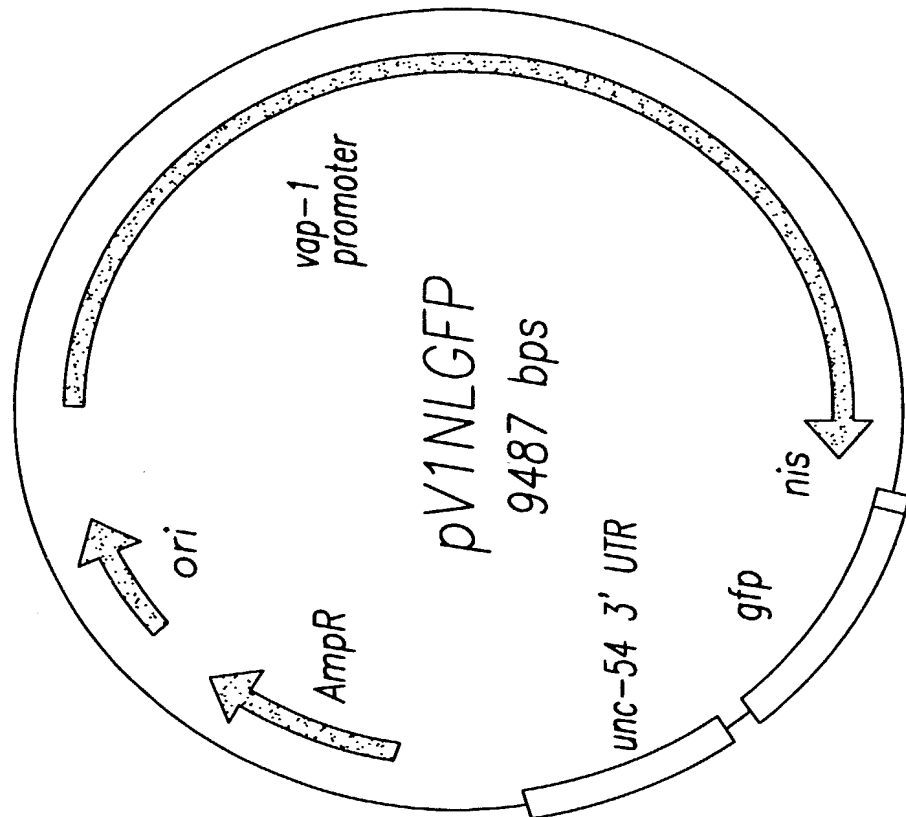


FIG. 5A





COPY OF PAPERS
ORIGINALLY FILED

11/12

FIG. 6A

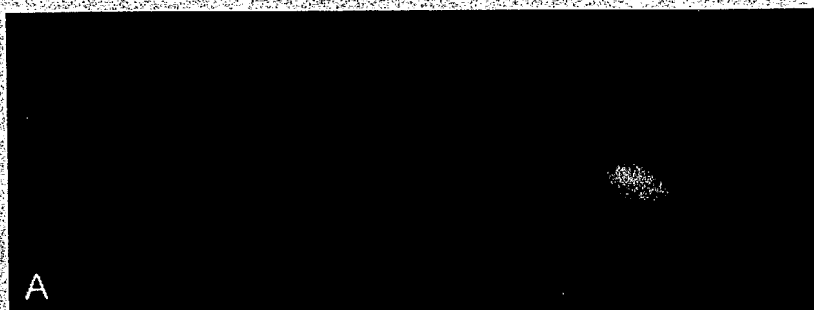


FIG. 6B

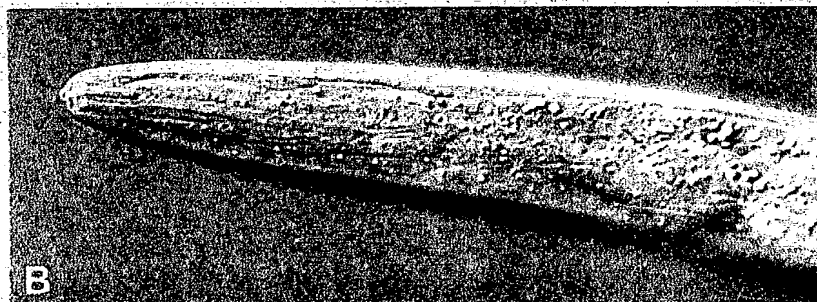
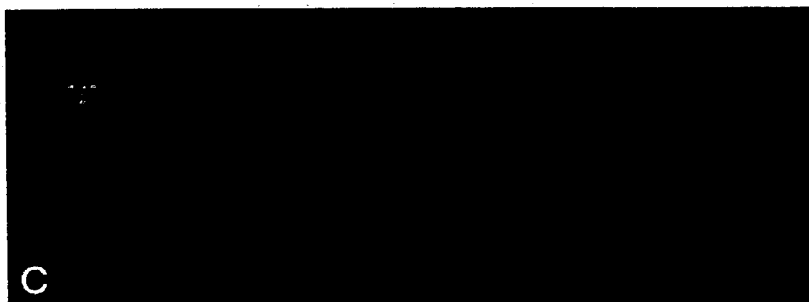


FIG. 6C





COPY OF PAPERS
ORIGINALLY FILED

12/12

FIG. 7

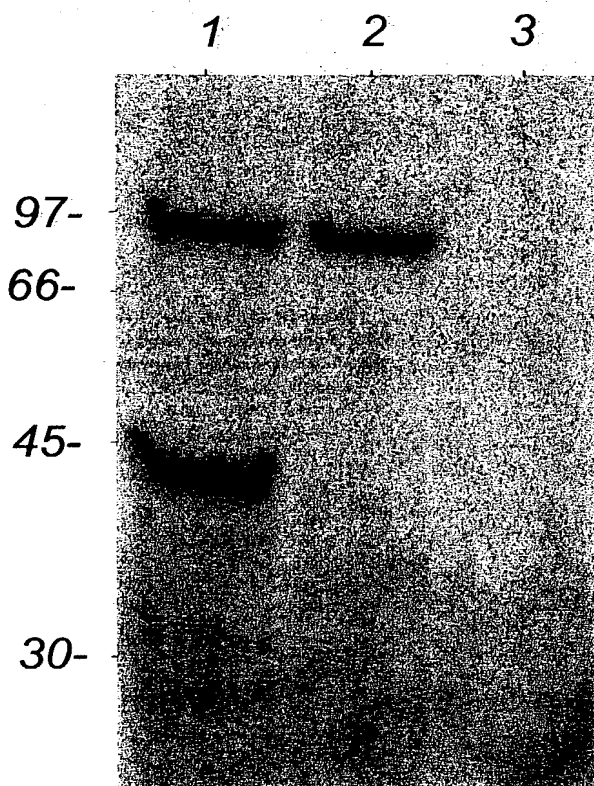


FIG. 8

